Pierre-David Létourneau

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Academic career

Chu Assistant Professor   2013-present
Columbia University, New York, New York

Ph.D.   2008-2013
Stanford University, Stanford, California
Advisors: *Prof. Eric Darve (Mech.Eng.), Prof. George Papanicolaou (Math.)*

M.S. (Statistics)   2009-2012
Stanford University, Stanford, California

Bachelor of Engineering (Honours Mechanical Engineering/Mathematics)   2004-2008
McGill University, Montréal, Québec, Canada
Advisor: *Prof. Michael P. Paidoussis*

Honours & Awards

Graduate carreer:
- Juan Simo Outstanding Thesis Award
- NSERC CGS-D Fellowship
- NSERC Alexander Graham Bell Canada Graduate Scholarship
- FQRNT – Bourse de maitrise en recherche

Undergraduate carreer:
- Distinction, Dean's honour list
- ASME Foundation Hanley Scholarship
- McConnell Award
- NSERC Undergraduate Summer Research Award
- Hong Kong Polytechnic University Sponsorship for Inbound Exchange Student award
- 1st Position 2006 ASME International Student Design Contest
- J.W. McConnel Scholarship

Research interests

- Wave propagation in heterogeneous media.
- Imaging and inverse problems.
- Fast algorithms and fast solvers.
- Numerical analysis.

Research Assistantships

Prof. *Josselin Garnier*   Summer 2012
École Normale Supérieure, rue d'Ulm, Paris, France
Imaging in random media.

Prof. *Ying Wu*   Spring 2012
KAUST, Jeddah, Saudi Arabia
Imaging in strongly-scattering media, solid-state physics, numerical linear algebra.

Prof. Laurent Demanet   Summer 2010
MIT, Cambridge, Massachussetts
Seismic imaging, applied harmonic analysis.

Prof. Michael P. Paidoussis   2007-2008
McGill University, Montréal, Québec, Canada
Nonlinear dynamics, spectral methods, numerical analysis.

Teaching

Instructor - Columbia University, New York, New York :
- Introduction to Complex Variables   Automn 2014
- Introduction to Numerical Analysis   Spring 2014
- Introduction to Complex Variables   Automn 2013

Teaching assistant- Stanford University, Stanford, California :
- Stochastic Methods in Engineering (Prof. George Papanicolaou)   Spring 2013
- Partial Differential Equations in Engineering (Prof. Sanjiva Lele)   Winter 2013
- Vector Calculus for Engineers (Prof. Margot Gerritsen)   Autumn 2012
- Introduction to Stochastic Differential Eq. (Prof. George Papanicolaou) Winter 2011
- Ordinary Differential Equations for Engineers (Prof. Eric Darve)   Winter 2010
- Probability & Statistics For Engineers (Dr. Vadim Khayms)   Winter 2009
- Vector Calculus for Engineers (Dr. Vadim Khayms)   Autumn 2008

Publications

1. P.-D. Létourneau, G.Bal, _Resolution and De-aliasing in ultrasound elastography._ (Submitted)
2. P.-D. Létourneau, E. Darve, _Approximate Gaussian Quadratures._ (Submitted)
3. P.-D. Létourneau, Y. Wu, J.Garnier, G. Papanicolaou, E. Darve, _A Numerical Investigation of Super-Resolution_. (In preparation)
4. P.-D. Létourneau, Y. Wu, G. Papanicolaou, E. Darve, _Fast 3D Wideband Algorithm for Acoustic Scattering in Highly Heterogeneous Media_. (In preparation)
5. P.-D. Létourneau, L. Demanet, H. Calandra, _Approximate inversion of the wave-equation Hessian via randomized matrix probing_, SEG expanded abstract, Las Vegas, 2012.
6. P.-D. Létourneau, C. Cecka, E. Darve, *Cauchy* _Fast Multipole for General Analytic Kernel_. *SIAM J. Sci. Comput.*, 36(2), A396-A426
7. L. Demanet, P.-D. Létourneau, N. Boumal, H. Calandra, J. Chiu, S. Snelson, _Matrix probing: a randomized preconditioner for the wave-equation Hessian_, *Appl. Comput. Harmon. Anal.* 32 (2012) 155-168
8. C. Cecka, P.-D. Létourneau, E. Darve, _Fast Multipole Method using the Cauchy Integral Formula_, BIRS Proceedings 2010
9. P.D. Létourneau, C. Cecka, E. Darve, _Generalized Fast Multipole Method_, 9th WCCM Proceedings

Conferences & Talks

1. Fluids/.Waves seminar, _Resolution and De-aliasing in Elastograpgy_, New Jersey Institute of technology, Newark, New Jersey, 2014.
2. CDI seminar, _Inverse Problems: Determination of atomic coordinates in nanoparticles from intensity data_, Brookhaven National Laboratory, Brookhaven, New York, 2014.
3. APAM Research seminar, _Fast algorithm for elastic wave propagation in highly-scattering media_, Columbia University, New York, 2013.
4. Multiscale waveform modeling, simulation, and inversion, _Fast algorithm for wave propagation in highly-scattering media_, KAUST, Saudi Arabia, 2013.
5. Bay Area Scientific Computing Day (BASC), _Fast algorithm for wave propagation in highly-scattering media_, Stanford, California, USA, 2012.

6. 8th European Solid Mechanics Conference (ESMC), *Fast computations of wave propagation in highly-heterogeneous media*, Graz, Austria, 2012.
7. Ecole Normale Superieure's imaging group weekly seminar, *Fast algorithm for wave propagation in highl-hHeterogeneous media*, Paris, France, 2012.
8. Waves and Imaging in Complex Media, *Fast 3D algorithm for wave propagation in strongly-scattering media* (Poster), Heraklion, Crete, Greece, 2012.
9. International Conference on Industrial and Applied Mathematics (ICIAM), *Cauchy fast multipole method for analytic kernel*, Vancouver, B.C., Canada, 2011.
10. SIAM conference on Mathematical and Computational Issues in the Geosciences, *Randomized operator fitting for preconditioning the wave-equation Hessian*, Long Beach, CA, USA, 2011.

Additional Information

Stanford SIAM student chapter, President   2008-2013
- Seminars :
  - o Seminars on Current Research in Engineering & Applied Mathematics (SCREAM 2009-12 / CME 510)
- Field trips :
  - o Stanford Linear Accelerator (SLAC - 2010)
  - o Computer History Museum (2011)

Spoken languages : English, French(native), Spanish(intermediate).
Programming skills: C++, MPI, CUDA, Matlab, Latex.